

0062366

VALIDATION REPORT

SAF NUMBER F03-006

SDG NUMBER WSCF20031516

— DRAFT

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FINAL

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DPF-114
(02/02)

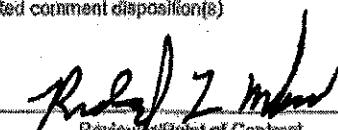
ORP - REVIEW COMMENT RECORD (RCR)

QRP 114
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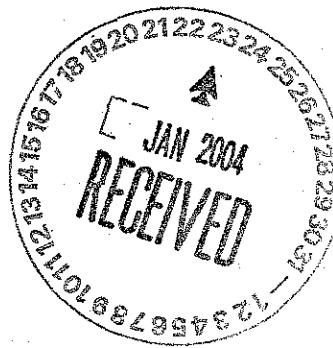
ORP - REVIEW COMMENT RECORD (RCR)

REVIEW COMMENT RECORD (RCR)

| | |
|------------------|---------------|
| 1. Date 12/12/03 | 2. Review No. |
| 3. Project No. | 1 of 1 |
| 200-PW-24 | 4. Page |

| | | | | |
|--|---|--|--|---|
| 5. Document Number(s)/Title(s) Validation Packages for SDG WSCF20031610 | 6. Program/Project/Building Number 210-A-26 Borehole | 7. Reviewer RL Welas | 8. Organization/Group S&DM | 9. Location/Phone Sigma 1 372-9631 |
| 17. Comment Submittal Approval: | | 18. Agreement with indicated comment disposition(s) | | 11. |
| Organization Manager (Optional) <u>2-6-04</u> | |  Reviewer/Point of Contact <u>2-6-04</u> Date | | Reviewer/Point of Contact |
| | | Author/Originator | | Author/Originator |
| 12. Item | 13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.) | | 14. Reviewer Comments Required | 15. Disposition (Provide justification if NOT accepted.) |
| 1 | Radiochemistry, pages 2,4, 8, & 13, Laboratory Blanks; Qualification of results based on failure of the laboratory to meet MDA goals (MDLs) for reported non-detects in the blank is not defined within the validation procedure. Qualification of Ra-226 results for sample B173V3 is not required by the procedure. Validation should note that the MDA goal was not achieved. The validator may apply additional qualifiers beyond those specified by the procedure based on technical judgement. However, when this is done, it must be specifically identified as validator judgement in the validation narrative. | | <u>OK</u> <u>RLW</u> <u>2-6-04</u> | Upon re-examination of the lab QC report it was found that the blank value was preceded by a very small question mark. No flag will be applied. Paragraph on p. 2 will be changed accordingly. |
| 2 | Radiochemistry, pages 4, & Appendix 3 MDA goals; MDA goals functionally do not apply for reported detects. It is not clear how missed MDA goals have been flagged in the result summaries (appears to be underlined by the validator). The method of flagging should be explained in the report and the report corrected to only flag missed MDA goals for non-detect results. | | <u>OK</u> <u>RLW</u> <u>2-6-04</u> | BNL-01433 Sec. 7.7 does not require consideration of sample result (detected vs. non-detect) when choosing MDAs for level C validation. The val. rpt. should change to discuss this. As stated in val. rpt., no flags were applied for high MDAs. |
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Date: November 24, 2003
To: Fluor Hanford Inc.
From: EQM
Project: PW-2, 216-A-36 Borehole
Subject: Radiochemistry-Data Package No. WSCF20031516



INTRODUCTION

This memo presents the results of data validation on Data Package No. WSCF20031516 prepared by WSCF Analytical. A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Analysis |
|-----------|-------------|-------|------------|------------|
| B173V2 | 07/30/03 | Soil | C | See note 1 |
| B173V3 | 07/31/03 | | | |
| B173V4 | 07/31/03 | | | |
| B173V5 | 08/04/03 | | | |

- 1- Gamma spectroscopy. The analysis for these samples is a rerun of the gamma spectroscopy analysis in SDG WSCF20031045.

Data validation was conducted in accordance with BHI validation procedure, *Data Validation Procedure for Radiochemical Analysis*, October 2000, BHI-01433, Rev. 0 and the *Uranium-Rich/General Process Condensate and Process Waste Group Operable Unit R/FS Work Plan and RCRA TSD Unit Sampling Plan*, DOE/RL-2000-60, Rev. 1.

Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Data Requested by Client – not applicable

DATA QUALITY PARAMETERS

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All sample results greater than the MDA and less than five times the highest blank concentration are qualified as estimates and flagged "J". Sample results below the MDA are qualified as undetected and flagged "U". Sample results above the MDA and greater than five times the highest blank concentration are not qualified.

The blank results for the gamma spectroscopy analysis did not report the MDA's with the blank results, however the blank results that were non-detects were flagged "U" by the laboratory. Therefore, it was assumed that those results flagged "U" were the same as the MDA.

- All the gamma spectroscopy blank results had "U" qualifiers except for Ra-226 and Ra-228 blank results associated with sample B173V5. The sample results for this sample for Ra-226 and Ra-228 were greater than the MDA's and greater than 5 times the blank results, therefore no qualifiers were needed.

Field Blank

No field blanks were submitted for analysis.

- Accuracy

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 65-135%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30%, tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

All LCS accuracy results were acceptable.

- Laboratory Duplicates

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If a duplicate sample was not analyzed, qualify all associated sample results as estimated (J, UJ). If the sample and duplicate concentration are both $>5\times RDL$ and the RPD is $>20\%$ for water samples ($>35\%$ for soil samples), qualify all associated sample and duplicate results as estimated (J). If both sample and duplicate results are non-detect, no qualification is required. If either or both of the sample and duplicate sample concentrations are $<5\times RDL$, the above RPD criteria do not apply and the range of the sample and duplicate concentrations must be evaluated as follows:

- If the range in concentration between the sample result(s) or quantitation limit(s) are $\leq RDL$ unit for water samples ($\leq 2\times RDL$ units for soil samples), no qualification is required.
- If the range in concentration between the sample result of quantitation limit are $>RDL$ unit for water samples ($>2\times RDL$ units for soil samples), then qualify all associated sample results as estimated (J). Non-detects are not qualified.

For samples B173V2, B173V3 and B173V4 the Eu-155 and Ra-228 duplicate results exceeded criteria, therefore the results were "J" flagged.

Field Duplicate

Samples B173V3 and B173V4 were field duplicates. The RPD's are calculated when both the sample results and the duplicate results are greater than 5X the analyte specific RDL. In addition, if either the sample or duplicate is less than 5X the analyte specific RDL, the range of the sample and duplicate concentrations must be evaluated.

Samples B173V3 and B173V4 were field duplicates. The duplicate criteria were exceeded for Co-60, Cs-137, Eu-154 and Ra-226.

As per the data validation procedure, data qualifiers are not required for field duplicate RPD's. The information is provided to alert data users to uncertainties in the data set during decision making.

- Detection Levels

The MDA's exceeded the RDL's for all reported results for samples B173V2 and B173V4. For sample B173V3, the MDA's exceeded the RDL's except for Cs-137.

However, despite the large MDAs, analytes were detected and reported in all cases except for Eu-152, Eu-154, and Eu-155 in samples B173V2, B173V3, and B173V4, and Ra-228 in samples B173V2 and B173V4.

Per the data validation procedure, no qualifiers were applied to the data.

- Completeness

Data package No. WSCF20031516 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

For samples B173V2, B173V3 and B173V4 the Eu-155 and Ra-228 duplicate results exceeded criteria, therefore the results were "J" flagged.

REFERENCES

Data Validation Procedure for Radiochemical Analysis, October 2000, BHI-01433, Rev. 0

Uranium-Rich/General Process Condensate and Process Waste Group Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan, DOE/RL-2000-60, Rev. 1.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimated, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the date are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2
Summary of Data Qualification

DATA QUALIFICATION SUMMARY

| SDG: WSCF20031516 | REVIEWER: KAB | DATE: 11/24/03 | PAGE 1 OF 1 |
|-----------------------------|-------------------------|-----------------------|------------------------|
| COMMENTS: | | | |
| SAMPLES AFFECTED | QUALIFIER | COMPOUND | REASON |
| B173V2 | J J | Eu-155 Ra-228 | Duplicate Duplicate |
| B173V3 | J J | Eu-155 Ra-228 | Duplicate Duplicate |
| B173V4 | J J | Eu-155 Ra-228 | Duplicate Duplicate |
| B173V5 | none | none | NA |

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

WSCF
ANALYTICAL RESULTS REPORT

Attention:
Project:

Steve Trent
F03-006, 200-PW-2/PW-4

Group #: WSCF2003|516

| Sample # | Client ID | CAS # | Test Performed | Matrix | WSCF | | DF | MDL | Analyze Sample | Receive | | |
|------------|--------------|-------|----------------|-------------------------------|--------|------------|----|----------|----------------|---------|-------|----------------------------|
| | | | | | Method | RQ | | | | | | |
| W030000980 | B17486 RERUN | TRENT | E.T.C. | U-235 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.026 | pCi/g | 1.00 | 0.0 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | 13082-38-2 | Zinc-65 | SOIL | LA-508-462 | U | 0.0408 | pCi/g | 1.00 | 0.061 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | E.T.C. | Zn-65 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.040 | pCi/g | 1.00 | 0.0 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | 14331-83-0 | Actinium-228 | SOIL | LA-508-462 | | 0.653 | pCi/g | 1.00 | 0.077 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | E.T.C. | Ac-228 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.13 | pCi/g | 1.00 | 0.0 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | 14913-42-0 | Bismuth-212 | SOIL | LA-508-462 | | 0.867 | pCi/g | 1.00 | 0.16 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | E.T.C. | Bi-212 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.21 | pCi/g | 1.00 | 0.0 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | 14733-03-0 | Bismuth-214 | SOIL | LA-508-462 | | 0.322 | pCi/g | 1.00 | 0.041 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | E.T.C. | Bi-214 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.075 | pCi/g | 1.00 | 0.0 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | 16098-94-1 | Lead-212 | SOIL | LA-508-462 | | 0.495 | pCi/g | 1.00 | 0.028 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | E.T.C. | Pb-212 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.073 | pCi/g | 1.00 | 0.0 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | 15067-28-4 | Lead-214 | SOIL | LA-508-462 | | 0.349 | pCi/g | 1.00 | 0.037 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | E.T.C. | Pb-214 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.067 | pCi/g | 1.00 | 0.0 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | 13068-53-1 | Ruthenium-103 | SOIL | LA-508-462 | U | 4.49e-03 | pCi/g | 1.00 | 0.018 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | E.T.C. | Ru-103 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.011 | pCi/g | 1.00 | 0.0 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | 19960-06-8 | Tin-113 | SOIL | LA-508-462 | U | 0.0114 | pCi/g | 1.00 | 0.021 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | E.T.C. | Sn-113 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.013 | pCi/g | 1.00 | 0.0 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | 14913-50-9 | Thallium-209 | SOIL | LA-508-462 | | 0.171 | pCi/g | 1.00 | 0.020 | 11/19/03 07/01/03 07/01/03 |
| W030000980 | B17486 RERUN | TRENT | E.T.C. | Tl-209 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.398 | pCi/g | 1.00 | 0.0 | 11/19/03 07/01/03 07/01/03 |
| W030000981 | B173V2 RERUN | TRENT | 14596-10-2 | Americanium-241 | SOIL | LA-508-462 | U | 0.161 | pCi/g | 1.00 | 11 | 11/20/03 07/30/03 08/04/03 |
| W030000981 | B173V2 RERUN | TRENT | E.T.C. | Am-241 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 1.6 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000981 | B173V2 RERUN | TRENT | 14234-35-6 | Antimony-125 | SOIL | LA-508-462 | U | 1.80 | pCi/g | 1.00 | 2.2 | 11/20/03 07/30/03 08/04/03 |
| W030000981 | B173V2 RERUN | TRENT | E.T.C. | Sb-125 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 1.5 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000981 | B173V2 RERUN | TRENT | 14762-78-8 | Cerium-144 | SOIL | LA-508-462 | U | 1.85 | pCi/g | 1.00 | 11 | 11/20/03 07/30/03 08/04/03 |
| W030000981 | B173V2 RERUN | TRENT | E.T.C. | Ce-144 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 6.7 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000981 | B173V2 RERUN | TRENT | 10198-40-0 | Cobalt-60 | SOIL | LA-508-462 | | 1.35 | pCi/g | 1.00 | 0.34 | 11/20/03 07/30/03 08/04/03 |
| W030000981 | B173V2 RERUN | TRENT | E.T.C. | Co-60 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.38 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |

MDL = Minimum Detection Limit U = Analyzed for but not detected above limiting criteria

RQ = Result Qualifier

DF = Dilution Factor

* - Indicates results that have NOT been validated

+ - Indicates more than six qualifier symbols

Report WGPP Ver. 1

Ground Water Protection Program

4B 11/24/03

WSCE
ANALYTICAL RESULTS REPORT

Attention:
Project:

Steve Trent
FO3-006, 200-PW-2/PW-4

Group #:

WSCE20031516

| Sample # | Client ID | CAS # | Test Performed | Matrix | WSCE | | DF | MDL | Analyze Sample | Receive | | |
|------------|--------------|-------|----------------|-------------------------------|--------|------------|----|--------|----------------|---------|------|----------------------------|
| | | | | | Method | RQ | | | | | | |
| W030000991 | B173V2 RERUN | TRENT | 13967-70-9 | Curium-154 | SOIL | LA-508-462 | U | 0.140 | pCi/g | 1.00 | 0.65 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Cs-134 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.93 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 10045-97-3 | Curium-157 | SOIL | LA-508-462 | | 5.08 | pCi/g | 1.00 | 0.62 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Cs-137 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 1.1 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 14983-23-9 | Europium-152 | SOIL | LA-508-462 | U | 1.42 | pCi/g | 1.00 | 2.7 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Eu-152 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 1.6 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 16686-10-1 | Europium-154 | SOIL | LA-508-462 | U | 0.167 | pCi/g | 1.00 | 0.59 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Eu-154 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.52 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 14381-16-3 | Europium-155 | SOIL | LA-508-462 | U | 0.461 | pCi/g | 1.00 | 6.6 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Eu-155 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 4.2 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 14981-63-1 | Niobium-94 | SOIL | LA-508-462 | U | 0.0124 | pCi/g | 1.00 | 0.50 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Nb-94 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.30 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 13983-63-3 | Hafnium-226 | SOIL | LA-508-462 | | 1.24 | pCi/g | 1.00 | 1.2 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Ra-226 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 1.1 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 15262-20-1 | Hafnium-228 | SOIL | LA-508-462 | U | 0.882 | pCi/g | 1.00 | 1.6 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Ra-228 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.95 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 13967-48-1 | Ruthenium-106 | SOIL | LA-508-462 | U | 2.04 | pCi/g | 1.00 | 5.5 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Ru-106 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 3.3 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 15832-50-6 | Th-128 | SOIL | LA-508-462 | U | 0.731 | pCi/g | 1.00 | 4.8 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Sr-126 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 3.0 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 15065-10-8 | Thorium-234 | SOIL | LA-508-462 | U | 10.1 | pCi/g | 1.00 | 87 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Th-234 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 53 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 15117-96-1 | Uranium-235 | SOIL | LA-508-462 | U | 3.27 | pCi/g | 1.00 | 11 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | U-235 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 6.6 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 13982-39-3 | Zinc-65 | SOIL | LA-508-462 | U | 0.170 | pCi/g | 1.00 | 0.80 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Zn-65 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.54 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 14331-83-0 | Actinidiun-228 | SOIL | LA-508-462 | U | 0.882 | pCi/g | 1.00 | 1.6 | 11/20/03 07/30/03 08/04/03 |

MDL = Minimum Detection Limit

U= Analyzed for but not detected above limiting criteria.

RQ = Result Qualifier

DF = Dilution Factor

++ - indicates results that have NOT been validated;

++ - indicates more than six qualifier symbols

Report WGPP Ver. 1

Ground Water Protection Program

Page 6

KB 11/24/03

WSCE
ANALYTICAL RESULTS REPORT

Attention:
Project:

Steve Trent
F03-006-200-PW-2/PW-4

Group #: WSCE20031516

| Sample # | Client ID | CAS # | Test Performed | Matrix | WSCE Method | RQ | Result | Unit | DF | MDL | Analyze Sample | Receive |
|------------|--------------|-------|----------------|---------------------------------|-------------|------------|--------|--------|-------|------|----------------|----------------------------|
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | As-228 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.95 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 14913-49-0 | Bismuth-212 | SOIL | LA-508-462 | U | 0.533 | pCi/g | 1.00 | 4.2 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | (Bi-212 Rel. Count Error (GEA)) | SOIL | LA-508-462 | ++ | 2.5 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 14730-03-0 | Bismuth-214 | SOIL | LA-508-462 | ++ | 1.24 | pCi/g | 1.00 | 1.2 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | (Bi-214 Rel. Count Error (GEA)) | SOIL | LA-508-462 | ++ | 1.1 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 15002-94-1 | Lead-212 | SOIL | LA-508-462 | U | 1.19 | pCi/g | 1.00 | 2.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Pb-212 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 1.3 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 15007-28-4 | Lead-214 | SOIL | LA-508-462 | U | 1.21 | pCi/g | 1.00 | 1.9 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Pb-214 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 1.2 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 13968-53-1 | Ruthenium-103 | SOIL | LA-508-462 | U | 0.344 | pCi/g | 1.00 | 0.71 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Ru-103 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.43 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 13966-06-8 | Tin-113 | SOIL | LA-508-462 | U | 0.116 | pCi/g | 1.00 | 1.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Sm-113 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.62 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | 14913-50-9 | Thallium-208 | SOIL | LA-508-462 | U | 0.124 | pCi/g | 1.00 | 0.65 | 11/20/03 07/30/03 08/04/03 |
| W030000991 | B173V2 RERUN | TRENT | E.T.C. | Tl-208 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.89 | pCi/g | 1.00 | 0.0 | 11/20/03 07/30/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 14690-10-2 | Amercurium-241 | SOIL | LA-508-462 | U | 0.274 | pCi/g | 1.00 | 0.48 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C. | Am-241 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.33 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 14234-35-6 | Antimony-125 | SOIL | LA-508-462 | ++ | 0.300 | pCi/g | 1.00 | 0.21 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C. | Sb-125 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.17 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 14762-78-8 | Curium-144 | SOIL | LA-508-462 | U | 0.262 | pCi/g | 1.00 | 0.49 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C. | Ce-144 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.29 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 10198-40-0 | <u>Cobalt-60</u> | SOIL | LA-508-462 | ++ | 0.239 | pCi/g | 1.00 | <u>0.097</u> | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C. | Co-60 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.097 | pCi/g | 1.00 | | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 13967-70-9 | Cesium-134 | SOIL | LA-508-462 | U | 0.0360 | pCi/g | 1.00 | 0.10 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C. | Cs-134 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.060 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 10046-97-3 | <u>Cesium-137</u> | SOIL | LA-508-462 | ++ | 2.13 | pCi/g | 1.00 | 0.085 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C. | Cs-137 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.38 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |

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Report WGRP ver. 1

Ground Water Protection Program

KB 11/24/03

WSCF
ANALYTICAL RESULTS REPORT

Attention:
Project:

Steve Trent
F03-006, 200 PW-2/PW-4

Group #:
WSCF20031516

| Sample # | Client ID | CAS # | Test Performed | Matrix | WSCF Method | RQ | Result | Unit | DF | MDL | Analyze Sample Receive |
|------------|--------------|-------|----------------|--------|-------------|----|-----------|-------|------|-------|----------------------------|
| W030000992 | B173V3 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.17 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 15092-94-1 | SOIL | LA-508-462 | | 0.470 | pCi/g | 1.00 | 0.14 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.19 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 16067-28-4 | SOIL | LA-508-462 | | 0.481 | pCi/g | 1.00 | 0.17 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.21 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 109966-53-1 | SOIL | LA-508-462 | U | -5.506-04 | pCi/g | 1.00 | 0.079 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 5.56-03 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 139866-08-8 | SOIL | LA-508-462 | U | -0.0311 | pCi/g | 1.00 | 0.098 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.059 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | 14913-50-9 | SOIL | LA-508-462 | | 0.199 | pCi/g | 1.00 | 0.081 | 11/20/03 07/31/03 08/04/03 |
| W030000992 | B173V3 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.095 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 14696-10-2 | SOIL | LA-508-462 | U | 0.121 | pCi/g | 1.00 | 0.46 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.27 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 14234-35-6 | SOIL | LA-508-462 | U | 0.293 | pCi/g | 1.00 | 0.37 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.27 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 14782-78-8 | SOIL | LA-508-462 | U | 0.192 | pCi/g | 1.00 | 0.77 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.40 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 10198-40-0 | SOIL | LA-508-462 | | 0.467 | pCi/g | 1.00 | 0.11 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.19 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 13987-70-9 | SOIL | LA-508-462 | U | 0.0583 | pCi/g | 1.00 | 0.12 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.067 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 10045-97-3 | SOIL | LA-508-462 | | 4.08 | pCi/g | 1.00 | 0.11 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.63 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 14693-23-9 | SOIL | LA-508-462 | U | 0.0487 | pCi/g | 1.00 | 0.35 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.21 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 15585-10-1 | SOIL | LA-508-462 | U | -0.0173 | pCi/g | 1.00 | 0.34 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | SOIL | LA-508-462 | + | 0.17 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |

MDL = Minimum Detection Limit

U= Analyzed for but not detected above limiting criteria.

RQ = Result Qualifier

DF = Dilution Factor

* Indicates results that have NOT been validated; ** - indicates more than six qualifier symbols

Report WGRP/ver. 1

Ground Water Protection Program

KB 11/24/03

WSCF
ANALYTICAL RESULTS REPORT

Attention:
Project:

Steve Trent
PO3-006: 200-PW-2/PW-4

Group #: WSCF20031516

| Sample # | Client ID | CAS # | Test Performed | Matrix | WSCF | | DF | MDL | Analyze Sample | Receive | | |
|------------|--------------|-------|----------------|-------------------------------|--------|------------|----|--------|----------------|---------|------|----------------------------|
| | | | | | Method | RQ | | | | | | |
| W030000993 | B173V4 RERUN | TRENT | 14391-16-3 | Europium-155 | SOIL | LA-508-462 | U | 0.105 | pCi/g | 1.00 | 0.40 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Eu-155 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.70 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 14381-63-1 | Niobium-94 | SOIL | LA-508-462 | U | 0.0426 | pCi/g | 1.00 | 0.11 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Nb-94 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.060 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 13982-63-3 | Radium-226 | SOIL | LA-508-462 | | 1.27 | pCi/g | 1.00 | 0.72 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Ra-226 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.35 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 15832-20-1 | Radium-228 | SOIL | LA-508-462 | | 0.861 | pCi/g | 1.00 | 0.39 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Ra-228 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.37 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 13987-48-1 | Ruthenium-106 | SOIL | LA-508-462 | U | 0.319 | pCi/g | 1.00 | 0.98 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Ru-106 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.61 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 15832-50-5 | Tin-126 | SOIL | LA-508-462 | U | 0.320 | pCi/g | 1.00 | 0.40 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Tm-126 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.20 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 18066-10-8 | Thorium-234 | SOIL | LA-508-462 | U | 0.774 | pCi/g | 1.00 | 3.9 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Th-234 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 2.3 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 15117-96-1 | Uranium-235 | SOIL | LA-508-462 | U | 0.710 | pCi/g | 1.00 | 0.82 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | U-235 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.63 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 13982-39-3 | Zinc-65 | SOIL | LA-508-462 | U | 0.547 | pCi/g | 1.00 | 0.22 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Zn-65 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.66 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 14331-83-0 | Actinium-228 | SOIL | LA-508-462 | | 0.861 | pCi/g | 1.00 | 0.39 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Ac-228 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.37 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 14913-19-6 | Bismuth-212 | SOIL | LA-508-462 | | 0.924 | pCi/g | 1.00 | 0.81 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Bi-212 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.71 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 14733-03-0 | Bismuth-214 | SOIL | LA-508-462 | | 1.27 | pCi/g | 1.00 | 0.22 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Bi-214 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.35 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 15092-94-1 | Lead-212 | SOIL | LA-508-462 | | 1.37 | pCi/g | 1.00 | 0.20 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | E.T.C | Pb-212 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.26 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4 RERUN | TRENT | 15067-28-4 | Lead-214 | SOIL | LA-508-462 | | 1.23 | pCi/g | 1.00 | 0.24 | 11/20/03 07/31/03 08/04/03 |

MDL = Minimum Detection Limit

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RQ = Result Qualifier

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* = Indicates results that have NOT been validated.

+ = Indicates more than six qualifier symbols

Report WQP/ver. 1

Ground Water Protection Program

KB 11/24/03

WSCF
ANALYTICAL RESULTS REPORT

Attention:
Project:

Steve Trent
P03-006: 200-PW-2/PW-4

Group #: WSCF20031516

| Sample # | Client ID | CAS # | Test Performed | Matrix | WSCF | | DF | MDL | Analyze Sample | Receive | | |
|------------|--------------|-------|----------------|-------------------------------|--------|------------|----|----------|----------------|---------|-------|----------------------------|
| | | | | | Method | RQ | | | | | | |
| W030000993 | B173V4-RERUN | TRENT | E.T.C. | Pu-214 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.37 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4-RERUN | TRENT | 13988-53-1 | Ruthenium-103 | SOIL | LA-508-462 | U | 0.0116 | pCi/g | 1.00 | 0.11 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4-RERUN | TRENT | E.T.C. | Ru-103 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.067 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4-RERUN | TRENT | 13988-06-8 | Tl-113 | SOIL | LA-508-462 | U | 0.0852 | pCi/g | 1.00 | 0.14 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4-RERUN | TRENT | E.T.C. | Sn-113 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.094 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4-RERUN | TRENT | 14913-50-9 | Thallium-208 | SOIL | LA-508-462 | + | 0.417 | pCi/g | 1.00 | 0.11 | 11/20/03 07/31/03 08/04/03 |
| W030000993 | B173V4-RERUN | TRENT | E.T.C. | Tl-208 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.19 | pCi/g | 1.00 | 0.0 | 11/20/03 07/31/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | 14596-19-2 | Amerplumb-241 | SOIL | LA-508-462 | U | 7.72e-03 | pCi/g | 1.00 | 0.13 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | E.T.C. | Am-241 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.077 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | 14234-35-6 | Antimony-120 | SOIL | LA-508-462 | + | 0.0878 | pCi/g | 1.00 | 0.067 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | E.T.C. | Sb-125 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.056 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | 14762-78-8 | Cerium-144 | SOIL | LA-508-462 | U | 0.0884 | pCi/g | 1.00 | 0.13 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | E.T.C. | Ce-144 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.091 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | 10198-40-0 | <u>Cobalt-60</u> | SOIL | LA-508-462 | + | 0.0445 | pCi/g | 1.00 | 0.028 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | E.T.C. | Co-60 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.023 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | 13997-70-9 | Cesium-134 | SOIL | LA-508-462 | U | 0.0329 | pCi/g | 1.00 | 0.049 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | E.T.C. | Cs-134 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.031 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | 10045-97-3 | <u>Curium-137</u> | SOIL | LA-508-462 | + | 0.0505 | pCi/g | 1.00 | 0.025 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | E.T.C. | Cs-137 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.023 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | 14683-23-9 | <u>Europium-152</u> | SOIL | LA-508-462 | U | 3.66e-03 | pCi/g | 1.00 | 0.061 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | E.T.C. | Eu-152 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.036 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | 15585-10-1 | <u>Europium-154</u> | SOIL | LA-508-462 | U | -0.0245 | pCi/g | 1.00 | 0.083 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | E.T.C. | Eu-154 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.059 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | 14391-16-3 | <u>Europium-155</u> | SOIL | LA-508-462 | + | 0.0850 | pCi/g | 1.00 | 0.068 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | E.T.C. | Eu-155 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.058 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | 14681-63-1 | Nickel-94 | SOIL | LA-508-462 | U | 2.16e-03 | pCi/g | 1.00 | 0.023 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173V5-RERUN | TRENT | E.T.C. | Nb-94 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.016 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |

MDL = Minimum Detection Limit

U - Analyzed for but not detected above limiting criteria.

RQ = Result Qualifier

DF = Dilution Factor

++ - Indicates results that have NOT been validated;

+++ - Indicates more than six qualifier symbols

Report WGPP/ver. 1

Ground Water Protection Program

KB 11/24/03

WSCE
ANALYTICAL RESULTS REPORT

Attention:
Project:

Steve Trent
F03-006: 200-PW-2/PW-4

Group #: WSCE20031516

| Sample # | Client ID | CAS # | Test Performed | Matrix | WSCE Method | RQ | Result | Unit | DF | MDL | Analyze Sample | Receive |
|------------|--------------|-------|----------------|-------------------------------|-------------|------------|--------|----------|-------|------|----------------|----------------------------|
| W030000994 | B173VS.RERUN | TRENT | 13982-63-3 | Radium-226 | SOIL | LA-508-462 | - | 0.466 | pCi/g | 1.00 | 0.045 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Ba-226 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.099 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 15262-20-1 | <u>Radium-228</u> | SOIL | LA-508-462 | - | 0.767 | pCi/g | 1.00 | 0.099 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Ba-228 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.17 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 13967-48-1 | Ruthenium-106 | SOIL | LA-508-462 | U | 0.0198 | pCi/g | 1.00 | 0.20 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Ru-106 Rel. Count Error (GEA) | SOIL | LA-508-462 | ++ | 0.12 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 15832-50-5 | Tin-120 | SOIL | LA-508-462 | U | 0.171 | pCi/g | 1.00 | 0.20 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Sr-126 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.051 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 15065-10-8 | Thorium-234 | SOIL | LA-508-462 | U | 0.071 | pCi/g | 1.00 | 1.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Th-234 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.04 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 15117-96-1 | Uranium-235 | SOIL | LA-508-462 | U | 0.110 | pCi/g | 1.00 | 0.14 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | U-235 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.039 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 13982-39-3 | Zinc-65 | SOIL | LA-508-462 | U | 0.97e-03 | pCi/g | 1.00 | 0.00 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Zn-65 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.040 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 14331-83-0 | Actinium-228 | SOIL | LA-508-462 | - | 0.767 | pCi/g | 1.00 | 0.089 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Ac-228 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.17 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 14813-49-6 | Bismuth-212 | SOIL | LA-508-462 | - | 0.410 | pCi/g | 1.00 | 0.19 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Bi-212 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.18 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 14733-03-0 | Bismuth-214 | SOIL | LA-508-462 | - | 0.465 | pCi/g | 1.00 | 0.045 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Bi-214 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.099 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 15092-94-1 | Lead-212 | SOIL | LA-508-462 | - | 0.737 | pCi/g | 1.00 | 0.038 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Pb-212 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.11 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 15067-28-4 | Lead-214 | SOIL | LA-508-462 | - | 0.518 | pCi/g | 1.00 | 0.044 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Pb-214 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.089 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 13968-53-1 | Ruthenium-103 | SOIL | LA-508-462 | U | 4.22e-03 | pCi/g | 1.00 | 0.021 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | E.T.C | Ru-103 Rel. Count Error (GEA) | SOIL | LA-508-462 | + | 0.012 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000994 | B173VS.RERUN | TRENT | 13966-06-8 | Tin-113 | SOIL | LA-508-462 | U | 3.44e-04 | pCi/g | 1.00 | 0.026 | 11/18/03 08/04/03 08/04/03 |

MDL = Minimum Detection Limit

U - Analyzed for but not detected above limiting criteria.

RQ = Result Qualifier

DF = Dilution Factor

* - Indicates results that have NOT been validated.

+ - Indicates more than six qualifier symbols.

Report WGPP ver. 1

Ground Water Protection Program

WSCE
ANALYTICAL RESULTS REPORT

Attention:
 Project:

Steve Trent
 F03-006: 200-PW 2/PW-4

Group #: WSCE20031516

| Sample # | Client ID | CAS # | Test Performed | Matrix | WSCE Method | RQ | Result | Unit | DF | MDL | Analyze Sample Receive |
|------------|--------------|-------|----------------|--------|-------------|----|---------|-------|------|-------|----------------------------|
| W030000934 | B173V6 RERUN | TRENT | E.T.C. | Soil | LA-508-162 | - | 3.4e-03 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |
| W030000934 | B173V5 RERUN | TRENT | 14913-50-9 | Soil | LA-508-162 | - | 0.196 | pCi/g | 1.00 | 0.022 | 11/18/03 08/04/03 08/04/03 |
| W030000934 | B173V5 RERUN | TRENT | E.T.C. | Soil | LA-508-162 | - | 0.041 | pCi/g | 1.00 | 0.0 | 11/18/03 08/04/03 08/04/03 |

MDL = Minimum Detection Limit

U - Analyzed for but not detected above limiting criteria.

RQ = Result Qualifier

~~KB 11/2 100 11/24/03~~

DF = Dilution Factor

* - indicates results that have NOT been validated;

+ - indicates more than six qualifier symbols

Report WGPP/ver. 1

Ground Water Protection Program

Appendix 4
Laboratory Narrative and Chain-of-Custody Documentation

Fiori Hanford, Inc.
Post Office Box 1009
Richland, Washington 99352

FLUOR

Memorandum

To: S. L. Finn

Date: V1141-03-SF-005
November 20, 2003

From: S. L. Fitzgerald Manager

WSCT Analytical Services

| W/Attachment | W/O Attachment |
|------------------|---------------------|
| T. F. Dale | S3-28 M. Neely |
| S. L. Fitzgerald | S3-30 D. Hart |
| H. K. McLean | S3-30 L. C. Swanson |
| J. P. Meeker | S3-30 File#B |

Subject: RERUNGED SAMPLE RESULTS FOR 200 PW-2/200 PW-4 OU - BORINGHOLE SOIL
SAMPLE DELIVERY GROUP WSCT 2003-1516. SAP NUMBER F03-006

References: (1) Groundwater Protection Program Letter of Instruction TH-ES-2003-MEN-001,
October 31, 2002

(2) HNL-SD-CD-QAPP-017, Rev. 3, Waste Sampling and Characterization Facility
Quality Assurance Plan

This letter contains a narrative (Attachment 1) for the sample delivery group (WSCT 2003-1516),
the analytical results (Attachment 2) and correspondence information (Attachment 3).

sff/ddw

Attachment 3

W1141-03 S1 F 065

ATTACHMENT I

NARRATIVE

Consisting of 2 pages
Cover page not included

| Customer Sample Number | Original Sample Delivery Group |
|------------------------|--------------------------------|
| B17317 | WSCEP20030863 |
| B17386 | WSCEP20030863 |
| B17372 | WSCEP20031045 |
| B17313 | WSCEP20031045 |
| B173V4 | WSCEP20031045 |
| B173VS | WSCEP20031045 |

Introduction

GPP requested WSCEP to re-run the above samples to include QC data for the GFA test. The above samples were issued under prior reports WSCEP20030863 and WSCEP20031045. These samples were analyzed in accordance with the *Groundwater Protection Program - Letter of Instruction*, referenced in the GFA letter.

The narrative (Attachment 1) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 2) includes analytical results, a comment or detailing method abnormalities, relevant identified results in applicable method references, and Laboratory Quality Information Copies of the other correspondence are included as Attachment 3.

Analytical Methodology for Requested Analyses

- The GFA analysis was run by internal WDOE accredited WSCEP procedures Analytical work was conducted in accordance to the approved method.

Comments

Ruth Neem - There are no hold times associated with this WDOE accredited method. A Laboratory Control Sample, Blank and Duplicate were analyzed with this assigned delivery group. See Page(s) 2, 8, 19, 20 and 21 for QC details.

This Summary Report is in compliance with the SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the WSCEP Laboratory Analytical Manager and Client Services, as verified by the following signature:

Troy Doss
WSCEP Production Control

Acknowledgments

Bg - mercury
GC - gas chromatography
ICP - inductively coupled plasma spectrometry
ICP-MS - ICP mass spectrometry
Total U - total uranium
ATB - total alpha/beta
ABA - Alpha Beta Activity
VTHG - Total Hydrocarbons-Caseline
TSS - Total Suspended Solids

An - americium

Cm - curium

Pb - plutonium

Np - neptunium

GFA - gamma filter analysis

Hf - hafnium

Sr - strontium 89, 90

VTHG - Total Hydrocarbons-Diesel

TSS - Total Suspended Solids

WTI-H-03-SLR-065

ATTACHMENT 3

SAMPLE RECEIPT INFORMATION

Consisting of 1 pages
Cover page not included

Date: Troy F.

From: Tren, Stephen J.
Sent: Friday, November 14, 2003 2:13PM
To: Troy F.; Neely, Michael
Cc: Trechner, John E.; Fitzgerald, Scott L.
Subject: RE: Urgent GPP request

Troy

Yes, go ahead and run the GEA on WSCF20031045 and WSCF20030663. We also need the tracer recovery information for WSCF20031045 and WSCF20031219.

GPP needs the run information and tracer recovery data as soon as possible because he has a subcontractor working up the remediation investigation report, and they can't proceed until certain portions of the report until the validation is complete.

Steve

—Original message—
From: Troy F.
Date: Friday, November 14, 2003 1:59 PM
To: Neely, Michael; Tren, Stephen J.
Cc: Trechner, John E.; Fitzgerald, Scott L.
Subject: RE: Urgent GPP request

Steve

The reports for 20031025 and 20031225 have the GEA OOO in the narrative needs to be corrected. We did all the GEA testing under 20031152 and 20031183 which took us up to 2003057. There are two groups between 10/25 and 12/25 and they are 20031065 and 20030663. Do you want 663 also?

Troy

—Original message—
From: Neely, Michael
Sent: Friday, November 14, 2003 1:04 PM
To: Troy F.
Cc: Trechner, John E.; Fitzgerald, Scott L.
Subject: Urgent GPP request
Importance: High

Troy

I just received a panned telephone call from Steve Tren with an urgent request. Steve was under the impression that he had previously instructed WSCF to run the QC samples (i.e., Laboratory Control Sample and Duplicate) with each sample delivery group including the gamma energy analysis (GEA). However, in the narrative for SIC 20031225, we state - "Except for GEA, a Laboratory Control Sample and Duplicate were analyzed with each sample delivery group per the GPP Letter of Instruction." Therefore, Steve is requesting that we re-run the GEAs for the following SDGs (and when we run the SDGs, we need to also include the tracer recovery data with the revised report).

- 1 20031225
- 2 20031045
- 3 20031219

Can you please provide me with an estimate of when the re-run and revised report can be submitted to Steve? Of course he is requesting the revised report by the end of next week. Thanks for your help with this.

Appendix 5
Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

RADIOCHEMICAL DATA VALIDATION CHECKLIST

| VALIDATION LEVEL | A | B | C | D | E |
|---------------------|-------------|------------------|----------------|--------------|--------------|
| PROJECT | Q | L-A-365 P(W)-Shm | | DATA PACKAGE | USCF20031516 |
| VALIDATOR | K. Brummett | LAB | USCF Analytics | DATE | 11/24/03 |
| CASE | | SDG | (USCF2173) | 516 | |

ANALYSES PERFORMED

| Gross Alpha Beta | Sureview-90 | Technitector-99 | Alpha Spectrometer | Custom Spectrometer | None |
|------------------|-------------|-----------------|--------------------|----------------------------|------|
| Total Uranium | Radium-226 | Radium | | | |

SAMPLES/MATRIX 6113V3 6113V3 6113V4 6113V5

160

This is a verbatim copy of 5D17-115CF007031C45 from the MAC.

1. Completeness N/A

Technical verification forms present? Yes No NA

Comments

2. Initial Calibration (Levels D, E)

Instruments/detectors calibrated?

Initial calibration acceptable?

Standards NIST traceable?

Appendix A – Radiochemical Data Validation Checklist

Standards Expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

_____3. Continuing Calibration (Levels D, E) N/A

Calibration checked within required frequency? Yes No N/A

Calibration check acceptable? Yes No N/A

Calibration check standards traceable? Yes No N/A

Calibration check standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

_____4. Background Counts (Levels D, E) N/A

Background Counts checked within required frequency? Yes No N/A

Background Counts acceptable? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E) N/A

Method blank analyzed within required frequency? Yes No N/A

Method blank results acceptable? Yes No N/A

Analytes detected in method blank? Yes No N/A

Field blank(s) analyzed? Yes No N/A

Field blank results acceptable? Yes No N/A

Analytes detected in field blank(s)? Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: No MDL's were reported w/ the blank results
Assumed that blank results were equal to or < MDL
results for those blank results w/ "0".

The blank associated w/ Rad226 for samples BN3V2, -V3
and V4, the blank results > the RDL. However, sample results > MDL
and >5 times the blank results, no outliers.

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) N/A

LCS/BSS analyzed within required frequency? Yes No N/A

LCS/BSS recoveries acceptable? Yes No N/A

LCS/BSS traceable? (Levels D,E) Yes No N/A

LCS/BSS expired? (Levels D,E) Yes No N/A

LCS/BSS levels correct? (Levels D,E) Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments:

7. Chemical Carrier Recovery (Levels C, D, E) N/A

Chemical carrier added? Yes No N/A

Chemical recovery acceptable? Yes No N/A

Chemical carrier traceable? (Levels D, E) Yes No N/A

Appendix A – Radiochemical Data Validation Checklist

Chemical carrier expired? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

Comments: _____

8. Tracer Recovery (Levels C, D, E) N/A

Tracer added? Yes No N/A

Tracer recovery acceptable? Yes No N/A

Tracer traceable? (Levels D, E) Yes No N/A

Tracer expired? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

Comments: _____

9. Matrix Spikes (Levels C, D, E) N/A

Matrix spike analyzed? Yes No N/A

Spike recoveries acceptable? Yes No N/A

Spike source traceable? (Levels D, E) Yes No N/A

Spike source expired? Levels D, E) Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: _____

Appendix A – Radiochemical Data Validation Checklist10. Duplicates (Levels C, D, E) N/ADuplicates Analyzed at required frequency? Yes No N/ARPD Values Acceptable? Yes No N/ATranscription/Calculation Errors? (Levels D, E) Yes No N/AComments: For Eu-155 and Ru-228 For samples B173V2, -V3, -V4J flag results11. Field QC Samples (Levels C, D E) N/AField duplicate sample(s) analyzed? Yes No N/AField duplicate RPD values acceptable? Yes No N/AField split sample(s) analyzed? Yes No N/AField split RPD values acceptable? Yes No N/APerformance audit sample(s) analyzed? Yes No N/APerformance audit sample results acceptable? Yes No N/AComments: Samples B173V3 and B173V4 are field QCs
Critera exceeded for Cs-60, Cs-137, Eu-154 and Ru-226

12. Holding Times (All levels)

Are sample holding times acceptable? Yes No N/A

Comments: _____

Appendix A – Radiochemical Data Validation Checklist

13. Results and Detection Limits (All Levels) N/A

Results reported for all required sample analyses? Yes No N/A

Results supported in raw data? (Levels D, E) Yes No N/A

Results Acceptable? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: Sample B1/B2 - All MOL's > RDL's

V3 - All MOL's > RDL's except for Cs-137 results

V4 - All MOL's > RDL's

V5 - All MOL's < RDL's